

Career & Technical Education

Principles of Agricultural Science
and Technology

AGRICULTURAL CAREER CLUSTER

CAREER MAJORS/CAREER PATHWAYS

Animal Science Systems
Agriscience Exploration (7 th -8 th Grade) - (no credit toward career major)
Recommended Courses
Principles of Agricultural Science & Technology Agriscience Animal Science Animal Technology Equine Science Adv. Animal Science Small Animal Tech Veterinary Science
Elective Courses
Ag. Math Food Science & Technology Food Processing, Dist. & Mkt. Aquaculture Ag. Sales and Marketing Ag. Construction Skills Ag. Power & Machinery Operation Agri-Biology Adv. Ag. Economics and Agribusiness Ag. Business/Farm Mgmt Ag. Employability Skills <ul style="list-style-type: none"> • Leadership Dynamics • Business Management • Marketing Management * Other Career and Technical Education Courses

- Other Career and Technical Education courses directly related to the student's Career Major/Career Pathway.
- "Bolded" courses are the "primary recommended courses" for this career major/career pathway. At least 3 of the 4 courses should come from this group of courses.

To complete a career major, students must earn four career-related credits within the career major. Three of the four credits should come from the recommended courses for that major.

NOTE: Agribiology is an interdisciplinary course, which meets the graduation requirements for Life Science. Agriscience Interdisciplinary course also meets the graduation requirements for Life Science. Agriculture Math is an interdisciplinary course, which may be offered for Math Credit.

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY TEMPLATE

COLLEGE/UNIVERSITY: _____

HIGH SCHOOL (S): _____

CLUSTER: Agriculture, Food, and Natural Resources

PATHWAY: Animal Science Systems

PROGRAM: Agricultural Education

	GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	REQUIRED COURSES RECOMMENDED ELECTIVE COURSES OTHER ELECTIVE COURSES CAREER AND TECHNICAL EDUCATION COURSES			CREDENTIAL CERTIFICATE DIPLOMA DEGREE
SECONDARY	9	△ English 1	△ Alegbra 1	△ Earth Science	△ Survey of SS	△ Health/PE	Principles of Ag. ☆		
	10	△ English 2	△ Geometry	△ Biology	△ World Civ.	△ Humanities	Agriscience Or Animal Science ☆		
	11	△ English 3	△ Alegbra 2	△ Chemistry	△ US History	Foreign Lan.	Small Animal or Animal Science ☆ Equine Science ☆		
	12	△ English 4	△ 4th math*	Anatomy/ Physiology		Foreign Lan.	Adv. Animal ☆ Vet Tech or Animal Tech ☆		Skill Stds Assmt- Animal
			* Pre Cal Rec. for College						
POSTSECONDARY	Year 13	Writing	Math	Chemistry + Labs	Humanities	Animal Science	Agronomy	Area or Specialization Course	
	Year 14	Writing		Biology	Social Sciences	Area or Specialization Course	Area or Specialization Course	Area or Specialization Course	
	Year 15			Organic Chemistry		Animal Nutrition	Production Courses	Area or Specialization Course	
	Year 16					Capstone/Sr. Seminar Class	Area or Specialization Course	Area or Specialization Course	BS Degree



CCTI

College and Career Transitions Initiative

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Required Courses △

Recommended Elective Courses ☆

Other Elective Courses

Career and Technical Education Courses

Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2)

(◆ = High School to Comm. College) (• = Com. College to 4-Yr Institution) (■ = Opportunity to test out)

Mandatory Assessments, Advising, and Additional Preparation

Note: Categories of courses (e.g. Required, Recommended Electives, other Electives and career and Technical Education) apply to both secondary and postsecondary levels.

Principles of Agricultural Science and Technology

Course Description: This course provides instruction in the foundations of the various segments of the agricultural industry. Agricultural career opportunities will be emphasized. Animal science, plant and land science, and agricultural mechanics skills will be the focus of the curriculum. The selection and planning of a supervised agricultural experience program and related record keeping will be presented. Leadership development will be provided through FFA. Students will receive personal guidance and counseling with preparatory instructional program selection.

	Content/Process
	Students will
1	<ul style="list-style-type: none"> demonstrate employability and social skills relative to the career cluster.
2	<ul style="list-style-type: none"> develop a supervised agricultural experience programs including use of record keeping.
3	<ul style="list-style-type: none"> explore basic agricultural skills needed including: math, communication, and employability skills.
4	<ul style="list-style-type: none"> identify and examine general soil and plant sciences.
5	<ul style="list-style-type: none"> identify and examine general animal sciences.
6	<ul style="list-style-type: none"> demonstrate basic agricultural mechanics and construction skills.
7	<ul style="list-style-type: none"> investigate basic environmental, food and fiber interrelationships.
8	<ul style="list-style-type: none"> maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
9	<ul style="list-style-type: none"> participate in FFA leadership activities which are integrated into the course.
<p style="text-align: center;">Connections</p> <ul style="list-style-type: none"> Kentucky Occupational Skill Standards Secretary's Commission on Achieving Necessary Skills (SCANS) 	

Principles of Agriculture Course Outline

Unit	Topics	Lesson	Activity	Learning Targets
Opportunities in Ag 10 Days	History of Ag.	Define Agriculture	Card Game; Use Frayer Model	Classify products related to agriculture; Evaluate data trends based on socio-demographics (where people live) and farming as a career
	Importance of Ag	Careers in Ag.	Snickers Activity	Justify the importance of agriculture in today's society; Differentiate career pathways and opportunities in agriculture
	Feeding the World	Who gets the cookie from the cookie jar?	Cookie Activity	Explain why American agriculture is so important to feeding the world population
	Careers in Agriculture	Careers in Ag.	Career Profile	Compose a career profile over careers in agriculture
Agriculture Leadership 15 Days	Ag. Leadership			
	History and operation of FFA	Creed	Video; Sing the Creed; Breaking Down the Creed	Analyze importance of and present the FFA creed
	Leadership	Civic and Agricultural Organizations		Identify and describe local civic and agricultural organizations
	Teamwork	Government	Governmental Guest Speaker	Describe the role of government in agriculture
	Parliamentary Procedure and Government	Parliamentary Procedure	Round Robin; Parli Contest; Christmas Party Activity	Demonstrate proper use of parliamentary procedure and good debate
		History of the FFA	Timeline Decades Day - Dress like the decade and present 10 different dates	Compare U.S. History to the FFA History
		Organization		Describe the hierarchy and organization of FFA
		Program of Activity	Create a 10 activity POA	Create a 10 activity POA
SAE 6 Days	Record Keeping	Record Keeping	Record keeping curriculum	Develop sound financial practices
	Management Decisions	SAE Plan	This is my SAE	Create an SAE Plan; Identify needs to get started; Develop a management plan
	Employability Skills	SAE Spotlight	SAE Showcase with parent night or other	Evaluate your SAE; Apply best management practices based on evaluations
Animal Science 11 Days	Breeds	Breed ID	Breed ID Booklet	Create a breed profile; Compare and contrast common breeds in Kentucky
	Terminology	Animal Terms	Animal Terms Bingo	Demonstrate proper use of Animal Terminology
		Production Systems	Verticle Integration, Horizontal Intergration, Locally Grown, Grass Fed, Feed Lot, Organic	Differentiate between various production systems
		Careers in Animal Science	Farm to Fork Project	Identify and describe various agricultural careers from Farm to Fork
	Taxonomy	Taxonomy	Classroom Taxonomy Sort	Classify animals into different taxonomic classifications
		Small Animal Breeds	Small Animal Jigsaw	Describe the reproductive systems, physiology, and breeds of various small animal species
Plant 11 Days	Basic plant science and plant parts	Flowers Parts	Disect and identify parts of a flower - Alstromeria is best	Disect and identify parts of a flower and its function
	Plant needs/Nutrition	Nutrient Testing	Dr. Dirt Lab; Lab Aids kit	Analyze macronutrients found in soil samples
	Plant physiology	Transpiration	AFNR Lab	Explain plant physiological processes
	Propagation	Asexual Propagation	Cuttings using hormone vs. no hormone, sand vs. perlite vs. promix	Demonstrate proper asexual propagation techniques

	Propagation	Sexual Propagation	Seed Experiment	Evaluate the impact of external factors on seed germination
Ag. Safety 5 Days	Risks	Risk Management Essay	National FFA Risk Management Curriculum	Apply best management practices to their SAE; Formulate an essay describing Risk Management practices
	Security Procedures		Do this Not That Posters	Demonstrate safe practices in agriculture
	Hazardous Substances	MSDS Project	MSDS Read for information (Vet Sc.)	Analyze MSDS sheets and warning labels on chemicals for safe use practices
	Safety Organization	Governmental Safety Organizations		Explain the role of safety organizations in the workplace
	Accident Prevention	Kayle's Difficult Decision	UK's Computer Simulated Module	Evaluate potential financial losses when proper decision making processes to remain accident free are not followed
Ag. Mech 11 Days	Measurement		Measurement Scavenger Hunt; MathWorksheets.com	Measure various objects with a tape measure
	GPS		Arc GIS App to determine Acreage	Evaluate the importance and effects of GIS and GPS on the future of the agricultural industry
	Building materials	Can you Build it?	Provide a drawing and break down to building materials	Create a materials list for a building project
	Design and Project Planning	Bird House Design	Complete a sketch, then a scaled drawing and materials list for your bird house	Create a sketch, scaled drawing, and materials list for a bird house
Environmental 6 Days	Water Quality	Water Testing; Dilution Lab	Students bring in samples from various places and analyze it for nitrates, phosphates, microbes; Brandon's example of Mr. Gator's Gas in Water demo	Analyze water samples for pollutants; Evaluate the pollutants potential impacts on the ecosystem
	Conservation	Erosion	Erosion Lab (Lab Kit); Erosion Scavenger Hunt	Recognize the types of erosion; Evaluate the causes and effects of erosion
	Ecosystems	Populations	Oh, Deer	Develop connections between biotic and abiotic factors in an ecosystem
Ag. Innovations 5 Days	Alternative Fuels	Comparison of Two Fuels	Lab Aids Lab	Compare and contrast the use of ethanol and kerosene
	Agriculture Issues	Socratic Seminar	Issues Debate	Debate pros and cons of various agriculture issues
	Biotechnology and Food Science	Who cut the Cheese?	Cheese Production Lab	Produce cheese following a lab procedure

Course Title	Principles of Agriculture Science and Technology	Grade Levels	9th	Credit Value	1
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Prerequisites	None				
Unit Title	<u>Opportunities in Agriculture</u>				

Technical Content

1-Demonstrate employability and social skills relative to the career cluster

KY Academic Standards (Big Idea)

Career Awareness, Exploration, Planning - Vocational Studies
Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Consumer Decisions - Vocational Studies
Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

English/Language Arts Standards

CC.9-10.L.1 Conventions of Standard English: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CC.9-10.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CC.9-10.W.4 Production and Distribution of Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

CC.9-10.W.8 Research to Build and Present Knowledge: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

21st Century Skills and Knowledge

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy

KOSSA Standards

- OC001 Apply use of related electronic technology (e-mail, computer applications, GPS, precision farming, ultrasound, electronic ear tags, and computer feeding).
- OC004 Maintain awareness of current trends in production agriculture through industry associations, trade journals, and internet resources.
- OL003 Use appropriate agricultural terminology.

Learning Targets

Sample Learner Activities - Click in the box to go to Activities

Classify products related to agriculture; Evaluate data trends based on socio-demographics (where people live) and farming as a career	-Files: AG Bio-products labels, What is Agriculture Assignment, What is Agriculture Lesson 1
Justify the importance of agriculture in today's society; Differentiate career pathways and opportunities in agriculture	-Put the ingredients for a candy bar on the board or a projector. Divide the students into pairs and have them brainstorm all of the careers that were involved in getting the candy bar from the farm to the "Wal-Mart" (or nearest grocery) shelves. It is helpful to give some hints to get them started. Encourage to them to think outside the box. At the end of an allotted time (10 minutes or so) call stop and have them go around the room and say a job, they can not duplicate a job that someone else has already called. Whichever team had the most legitimate jobs gets the candy bar.
Explain why American agriculture is so important to feeding the world population	-Document: World Hunger (Cookie Activity)
Compose a career profile over careers in agriculture	-File: Career Profile

Technical Literacy Standards

- Key Ideas and Details - 9-10 - Cite specific evidence to support analysis of text
- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Integration of Knowledge and Ideas - 9-10 - Translate quantitative or technical information expressed in words in a text into visual form
- Text Types and Purpose - 9-10 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes

Course Title	Principles of Agriculture Science and Technology	Grade Levels	9th	Credit Value	1
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Prerequisites	None				
Unit Title	<u>Agriculture Leadership</u>				

Technical Content

- 1-Demonstrate employability and social skills relative to the career cluster
- 3-Explore basic agricultural skills needed including: math, communication, and employability
- 9-participate in FFA leadership activities which are integrated into the course

KY Academic Standards (Big Idea)

Career Awareness, Exploration, Planning - Vocational Studies
Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Employability Skills - Vocational Studies
Employability skills will focus on student’s competencies with their work habits and academic/technical skills that will impact an individual’s success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Information, Communication and Productivity - Technology
Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.

Government and Civics - Social Studies
The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure, and the role of citizens. Understanding the historical development of structures of power, authority, and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

English/Language Arts Standards

CC.9-10.SL.1.d Comprehension and Collaboration: Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.

CC.9-10.L.4 Vocabulary Acquisition and Use: Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies.

CC.9-10.SL.3 Comprehension and Collaboration: Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

CC.9-10.SL.1.b Comprehension and Collaboration: Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.

21st Century Skills and Knowledge

- Leadership and Responsibility
- Civic Literacy
- Communication
- Critical Thinking and Problem Solving
- Creativity and Innovation
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communications, and Technology) Literacy
- Flexibility and Adaptability

KOSSA Standards

- AA010 Demonstrate the characteristics of a team player.
- AA012 Perform techniques used as a team leader.
- AA011 Contrast the roles of a team with the role of an individual.
- AA014 Organize and deliver a persuasive oral presentation.
- AA013 Demonstrate productive relationships within the work group.

Learning Targets

Analyze importance of and present the FFA creed
Identify and describe local civic and agricultural organizations
Describe the role of government in agriculture
Demonstrate proper use of parliamentary procedure and good debate
Compare U.S. History to the FFA History
Describe the hierarchy and organization of FFA
Explain the importance of the program of activities in an FFA chapter

Sample Learner Activities - Click in the box to go to Activities

-If you have video cameras available (like Flip), divide the students into groups of 5. Have them each draw a character such as cheerleader, 90 year old granny, Santa Claus, rapper, army sergeant... They will pick a paragraph within their groups and say their paragraph for the camera. Put them all together and watch them in front of the class. They will see the Creed at least 5 times and will have a little fun!
-File: Local civic and agriculture organizations
-File: Government Guest Speaker
-Document: Parliamentary Procedures in Class Contest
-Document: Time Line of Agriculture (FFA)
-File: Hierarchy of FFA
-File: Program of Activities

Technical Literacy Standards

- Integration of Knowledge and Ideas - 9-10 - Translate quantitative or technical information expressed in words in a text into visual form
- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Text Types and Purpose - 9-10 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes

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Prerequisites	None				
Unit Title	<u>Supervised Agriculture Experience</u>				

Technical Content

8- Maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions

KY Academic Standards (Big Idea)

Career Awareness, Exploration, Planning - Vocational Studies
Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Employability Skills - Vocational Studies
Employability skills will focus on student’s competencies with their work habits and academic/technical skills that will impact an individual’s success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Financial Literacy - Vocational Studies
Financial literacy provides knowledge so that students are responsible for their personal economic well-being. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one’s lifetime. Financial literacy will empower students by providing them with the knowledge, skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Economics - Social Studies
Economics includes the study of production, distribution and consumption of goods and services. Students need to understand how their economic decisions affect them, others, the nation and the world. The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

English/Language Arts Standards

CC.9-10.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Mathematics Standards

CC.9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.*

CC.9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

CC.9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*

CC.9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.*

CC.9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

CC.9-12.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm’s law $V = IR$ to highlight resistance R .*

CC.9-12.F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.*

CC.9-12.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

21st Century Skills and Knowledge

- Financial, Economic, Business and Entrepreneurial Literacy
- Critical Thinking and Problem Solving
- Communication
- Collaboration
- Information Literacy
- Media Literacy
- ICT (Information, Communications, and Technology) Literacy
- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills

KOSSA Standards

- OC001 Apply use of related electronic technology (e-mail, computer applications, GPS, precision farming, ultrasound, electronic ear tags, and computer feeding).
- OD001 Apply effective record keeping skills including financial records.
- OD002 Demonstrate knowledge of budgeting and cash flow.
- OL003 Use appropriate agricultural terminology.
- AB001 Add, subtract, multiply, and divide four-digit numbers with/without the use of a calculator.
- AB003 Apply basic math functions to solve problems.
- AB005 Convert fractional measurement to decimal measurement.
- AB006 Compute within measurement systems.
- AB008 Calculate with percents, rate, ration, and proportion with the use of a calculator.
- AB009 Make reasonable estimates.

Learning Targets

Develop sound financial practices	-Use of KY Record Keeping Materials
Create an SAE Plan; Identify needs to get started; Develop a management plan	-File name: SAE explore assignment -File: SAE Planning Sheet -File: Understanding SAE worksheet
Evaluate your SAE; Apply best management practices based on evaluations	-File: SAE Project Showcase

Sample Learner Activities - Click in the box to go to Activities

Technical Literacy Standards

- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Integration of Knowledge and Ideas - 9-10 - Translate technical information into visual form
- Text Types and Purpose - 9-10 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes

Course Title	Principles of Agriculture Science and Technology	Grade Levels	9th	Credit Value	1
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Prerequisites	None				
Unit Title	<u>Introduction to Animal Science</u>				

Technical Content

5 - Identify and examine general animal science

KY Academic Standards (Big Idea)

Career Awareness, Exploration, Planning - Vocational Studies
Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Biological Change (Biological Science) - Science
The only thing certain is that everything changes. At the high school level, students evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on Earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity, and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years.

Unity and Diversity (Biological Science) - Science
All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate deoxyribonucleic acid (DNA) and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable

English/Language Arts Standards

CC.9-10.R.I.7 Integration of Knowledge and Ideas: Analyze various accounts of a subject told in different mediums (e.g., a person’s life story in both print and multimedia), determining which details are emphasized in each account.

CC.9-10.SL.2 Comprehension and Collaboration: Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CC.9-10.W.2 Text Types and Purposes: Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

21st Century Skills and Knowledge

- Financial, Economic, Business and Entrepreneurial Literacy
- Environmental Literacy
- Creativity and Innovation
- Critical Thinking and Problem Solving
- Information Literacy
- Media Literacy
- ICT (Information, Communications, and Technology) Literacy
- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills

KOSSA Standards

- AC001 Understand scientific plant and animal classification.
- AC002 Compare the anatomical parts and distinguishing characteristics of plants and animals.
- AC004 Analyze the process of plant and animal growth and development.
- OC001 Apply use of related electronic technology (e-mail, computer applications, GPS, precision farming, ultrasound, electronic ear tags, and computer feeding).
- OC004 Maintain awareness of current trends in production agriculture through industry associations, trade journals, and internet resources.
- OH005 Utilize understanding of varieties and breeds in the management and prevention of diseases
- OL003 Use appropriate agricultural terminology.
- OL005 Demonstrate knowledge of livestock breeds.

Learning Targets

Sample Learner Activities - Click in the box to go to Activities

Create a breed profile; Compare and contrast common breeds in Kentucky	-File Breed ID Booklet
Demonstrate proper use of Animal Terminology	-File: Animal Terms Bingo
Differentiate between various production systems	-File:Production System Activity
Identify and describe various agricultural careers from Farm to Fork	-File: Beef from Pasture to Plate
Classify animals into different taxonomic classifications	- http://www.cteonline.org/portal/default/Curriculum/Viewer/Curriculum?action=2&view=viewer&cmobjid=202315
Describe the reproductive systems, physiology, and breeds of various small animal species	-File: Small Animal Jigsaw

Technical Literacy Standards

- Integration of Knowledge and Ideas - 9-10 - Translate quantitative or technical information expressed in words in a text into visual form
- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Key Ideas and Details - 9-10 - Cite specific evidence to support analysis of text
- Text Types and Purpose – 9-10 – Write arguments focused on discipline-specific content

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Prerequisites	None				
Unit Title	<u>Introduction to Plant Science</u>				

Technical Content

4-Identify and examine general soil and plant science

KY Academic Standards (Big Idea)

Biological Change (Biological Science) - Science
The only thing certain is that everything changes. At the high school level, students evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on Earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity, and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years.

Unity and Diversity (Biological Science) - Science
All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate deoxyribonucleic acid (DNA) and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable

English/Language Arts Standards

CC.9-10.W.1 Text Types and Purposes: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

CC.9-10.W.4 Production and Distribution of Writing: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

21st Century Skills and Knowledge

- Critical Thinking and Problem Solving
- Environmental Literacy
- Creativity and Innovation
- Communication
- ICT (Information, Communications, and Technology) Literacy
- Media Literacy
- Initiative and Self-Direction
- Information Literacy
- Leadership and Responsibility

KOSSA Standards

- AC001 Understand scientific plant and animal classification.
- AC002 Compare the anatomical parts and distinguishing characteristics of plants and animals.
- AC003 Understand the reproductive processes of plants and animals.
- AC005 Be aware of biotechnology and its uses in production agriculture.
- AC006 Explain the use of applied genetics in plants and animals.
- OB002 Demonstrate ability to read and utilize seed tag information.
- OC001 Apply use of related electronic technology (e-mail, computer applications, GPS, precision farming, ultrasound, electronic ear tags, and computer feeding).
- OC004 Maintain awareness of current trends in production agriculture through industry associations, trade journals, and internet resources.
- OH005 Utilize understanding of varieties and breeds in the management and prevention of diseases
- OL001 Identify common agronomic plants, grains, feeds, and seeds.
- OL003 Use appropriate agricultural terminology.

Learning Targets

Disect and identify parts of a flower and its function	-Materials needed: Card stock, packaging tape or laminating paper, fine-point Sharpies and Alstroemerias -Put a list of the flower parts to be included on the board or overhead. Have students pull off 2 petals from the Alstroemerias and put them on the card stock with the tape, laminating paper. Use the Sharpies to label the parts. -Another option is to have the students create a 3-D flower labeling all of the parts as they go. -File: Flower Diagram
Analyze macronutrients found in soil samples	-File: How to test soil
Explain plant physiological processes	-File: Transpiration Lab
Demonstrate proper asexual propagation techniques	-Document: Propagation Experiment -Document: Lab report -Document: Lab Report Example
Evaluate the impact of external factors on seed germination	-Link: http://hilo.hawaii.edu/affiliates/prism/documents/lesson6seedgermination.pdf

Sample Learner Activities - Click in the box to go to Activities

Technical Literacy Standards

- Text Types and Purpose – 9-10 – Write arguments focused on discipline-specific content
- Text Types and Purpose - 9-10 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes
- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Integration of Knowledge and Ideas - 9-10 - Translate quantitative or technical information expressed in words in a text into visual form

Course Title	Principles of Agriculture Science and Technology	Grade Levels	9th	Credit Value	1
Description	This course provides instruction in the foundations of the various segments of the agricultural industry. Agricultural career opportunities will be emphasized. Animal science, plant and land science, and agricultural mechanics skills will be the focus of the curriculum. The selection and planning of a supervised agricultural experience program and related record keeping will be presented. Leadership development will be provided through FFA. Students will receive personal guidance and counseling with preparatory instructional program selection.				
Prerequisites	None				
Unit Title	<u>Agriculture Safety</u>				

Technical Content

- 1-Demonstrate employability and social skills relative to the career cluster
- 3-Explore basic agricultural skills needed including: math, communication, and employability skills

KY Academic Standards (Big Idea)

Career Awareness, Exploration, Planning - Vocational Studies
 Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Employability Skills - Vocational Studies
 Employability skills will focus on student’s competencies with their work habits and academic/technical skills that will impact an individual’s success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Safety (Health Education) - Practical Living
 Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving a motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work. Safe behavior protects a person from danger and lessens the effects of harmful situations.

Safety and Ethical/Social Issues - Technology
 Students understand safe and ethical/social issues related to technology. Students practice and engage in safe, responsible and ethical use of technology. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits and productivity.

English/Language Arts Standards

CC.9-10.R.L.1 Key Ideas and Details: Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

CC.9-10.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CC.9-10.W.2 Text Types and Purposes: Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

21st Century Skills and Knowledge

- Financial, Economic, Business and Entrepreneurial Literacy
- Health Literacy
- Environmental Literacy
- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication
- Information Literacy
- Media Literacy
- ICT (Information, Communications, and Technology) Literacy
- Flexibility and Adaptability

KOSSA Standards

- OC004 Maintain awareness of current trends in production agriculture through industry associations, trade journals, and internet resources.
- OJ003 Identify hazardous substances in the workplace.
- OJ004 Identify immediate and real costs of an accident.
- OJ005 Identify methods of preventing accidents in the workplace.
- OJ006 Assume responsibility for the personal safety of self and others.
- OJ007 Report unsafe practices to appropriate personnel.
- OM003 Demonstrate the ability to safely operate basic agriculture equipment.

Learning Targets

Sample Learner Activities - Click in the box to go to Activities

Apply best management practices to their SAE; Formulate an essay describing Risk Management practices	-Use National FFA's Risk Management Program
Demonstrate safe practices in agriculture	-Files: Personal Safety in Shop -Shop Safety Quiz
Analyze MSDS sheets and warning labels on chemicals for safe use practices Explain the role of safety organizations in the workplace	-Document: Analyzing an MSDS
Evaluate potential financial losses when proper decision making processes to remain accident free are not followed	-Files: No Way to Meet a Neighbor - Problem Booklet -No way to meet a neighbor - Tips -No way to meet a neighbor - Answer sheet -No way to meet a neighbor - Answer Key -File: Farming is a risky business

Technical Literacy Standards

- Integration of Knowledge and Ideas - 9-10 - Translate quantitative or technical information expressed in words in a text into visual form
- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Text Types and Purpose - 9-10 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes

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Prerequisites	None				
Unit Title	<u>Introduction to Agriculture Mechanics</u>				

Technical Content

6-Demonstrate basic agricultural mechanics and construction skills

KY Academic Standards (Big Idea)

Career Awareness, Exploration, Planning - Vocational Studies
Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Safety (Health Education) - Practical Living
Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving a motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work. Safe behavior protects a person from danger and lessens the effects of harmful situations.

Research, Inquiry/Problem-Solving and Innovation - Technology
Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.

Mathematics Standards

CC.9-12.G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*

CC.9-12.G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*

CC.9-12.G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*

CC.9-12.G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*

CC.9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.*

CC.9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

CC.9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*

21st Century Skills and Knowledge

- Financial, Economic, Business and Entrepreneurial Literacy
- Health Literacy
- Environmental Literacy
- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication
- Information Literacy
- Initiative and Self-Direction
- Productivity and Accountability
- Leadership and Responsibility

KOSSA Standards

- AB001 Add, subtract, multiply, and divide four-digit numbers with/without the use of a calculator.
- AB003 Apply basic math functions to solve problems.
- AB004 Convert between US and metric measurement systems.
- AB005 Convert fractional measurement to decimal measurement.
- AB006 Compute within measurement systems.
- AB007 Document results of measurement activities and calculations.
- AB009 Make reasonable estimates.
- AB011 Compute calculated measurements.
- OF006 Determine material supplies.
- OF001 Utilize basic units of distance, dry and liquid measurements.
- OJ002 Identify and follow emergency, safety and health rules/procedures.
- OJ003 Identify hazardous substances in the workplace.
- OJ005 Identify methods of preventing accidents in the workplace.
- OJ006 Assume responsibility for the personal safety of self and others.
- OJ007 Report unsafe practices to appropriate personnel.
- OM003 Demonstrate the ability to safely operate basic agriculture equipment.

Learning Targets

- Measure various objects using a variety of measuring instruments
- Evaluate the importance and effects of GIS and GPS on the future of the agricultural industry
- Create a materials list for a building project
- Create a sketch, scaled drawing, and materials list for a bird house

Sample Learner Activities - Click in the box to go to Activities

- Link: http://themathworksheetsite.com/read_tape.html
-Create a list of items around the room. Have students practice measuring them.
- Document: GPS Lesson Plan (Colorado)
- File: Bird house design
- File: Can you build it blue bird house plan

Technical Literacy Standards

- Integration of Knowledge and Ideas - 9-10 - Translate quantitative or technical information expressed in words in a text into visual form
- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Text Types and Purpose - 9-10 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes

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Prerequisites None

Unit Title **Environmental Science**

Technical Content

7-Investigate basic environmental, food, and fiber interrelationships

KY Academic Standards (Big Idea)

Biological Change (Biological Science) - Science

The only thing certain is that everything changes. At the high school level, students evaluate the role natural selection plays in the diversity of species. Modern ideas of evolution provide a scientific explanation for three main sets of observable facts about life on Earth: the enormous number of different life forms we see about us, the systematic similarities in anatomy and molecular chemistry we see within that diversity, and the sequence of changes in fossils found in successive layers of rock that have been formed over more than a billion years.

Unity and Diversity (Biological Science) - Science

All matter is comprised of the same basic elements, goes through the same kinds of energy transformations, and uses the same kinds of forces to move. Living organisms are no exception. At the high school level, an in-depth study of the specialization and chemical changes occurring at the cellular level builds upon the foundational ideas developed earlier to investigate deoxyribonucleic acid (DNA) and effects of alterations in DNA for an individual organism as well as for a species. Emphasis at every level should be placed upon the understanding that while every living thing is composed of similar small constituents that combine in predictable

Career Awareness, Exploration, Planning - Vocational Studies

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

English/Language Arts Standards

CC.9-10.W.2 Text Types and Purposes: Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

CC.9-10.W.8 Research to Build and Present Knowledge: Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

Mathematics Standards

CC.9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

CC.9-12.A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

21st Century Skills and Knowledge

Financial, Economic, Business and Entrepreneurial Literacy

Environmental Literacy

Civic Literacy

Health Literacy

Critical Thinking and Problem Solving

Communication

Collaboration

Information Literacy

ICT (Information, Communications, and Technology) Literacy

Flexibility and Adaptability

KOSSA Standards

- AC005 Be aware of biotechnology and its uses in production agriculture.
- AC006 Explain the use of applied genetics in plants and animals.
- AC004 Analyze the process of plant and animal growth and development.
- OC001 Apply use of related electronic technology (e-mail, computer applications, GPS, precision farming, ultrasound, electronic ear tags, and computer feeding).
- OC004 Maintain awareness of current trends in production agriculture through industry associations, trade journals, and internet resources.

Learning Targets

Sample Learner Activities - Click in the box to go to Activities

Analyze water samples for pollutants; Evaluate the pollutants potential impacts on the ecosystem	
Recognize the types of erosion; Evaluate the causes and effects of erosion	-Document: Erosion Lab (website link to kit included in the document)
Develop connections between biotic and abiotic factors in an ecosystem	-File: Oh Deer

Technical Literacy Standards

- Craft and Structure - 9-10 - Determine the meaning of symbols, terms, and domain-specific words or phrases
- Key Ideas and Details - 9-10 - Cite specific evidence to support analysis of text
- Text Types and Purpose – 9-10 – Write arguments focused on discipline-specific content

Course Title	Principles of Agriculture Science and Technology	Grade Levels	9th	Credit Value	1
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Prerequisites	None				
Unit Title	<u>Agriculture Innovations</u>				

Technical Content

- 1- Demonstrate employability and social skills relative to the career cluster.
- 3- Explore basic agricultural skills needed including math, communications, and employability skills
- 7- Investigate basic environmental, food and fiber interrelationships

English/Language Arts Standards

CC.9-10.R.I.8 Integration of Knowledge and Ideas: Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.

CC.9-10.SL.1 Comprehension and Collaboration: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.

CC.9-10.SL.1.c Comprehension and Collaboration: Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

CC.9-10.SL.4 Presentation of Knowledge and Ideas: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

21st Century Skills and Knowledge

- Financial, Economic, Business and Entrepreneurial Literacy
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- Communication
- Information Literacy
- Media Literacy
- ICT (Information, Communications, and Technology) Literacy

KOSSA Standards

AC005 Be aware of biotechnology and its uses in production agriculture.

OC003 Interpret the input of local, state, national, and international economy to production agriculture.

Learning Targets

Compare and contrast the use of ethanol and kerosene
Debate pros and cons of various agriculture issues
Produce cheese following a lab procedure

Sample Learner Activities - Click in the box to go to Activities

-File: Comparing two fuels
-Set up a class debate. Use this link to find some great topics: http://web.ics.purdue.edu/~peters/HTML/home.html
-File: Cheese production

Technical Literacy Standards

Integration of Knowledge and Ideas - 9-10 - Translate quantitative or technical information expressed in words in a text into visual form

Key Ideas and Details - 9-10 - Cite specific evidence to support analysis of text

Text Types and Purpose - 9-10 - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes